REMARKS

This application contains claims 1-9, 11-19 and 21. Claims 10 and 20 were previously cancelled. Claims 1 and 11 have been amended herein.

Claims 1-9, 11-19 and 21 were rejected under 35 U.S.C. 103(a) as being obvious over Bala in view of Fu et al. The helpful comments of the Examiner in paragraph 6, on page 4 of the Office Action have been carefully considered and utilized. In view of the amendments made herein, and the remarks below, these rejections are respectfully traversed.

Applicants' invention, as set forth in claim 1, as amended herein, is directed to in a computing system that executes a computer program, including dynamic compilation capability, a method for controlling the execution of an instruction of the computer program. The method comprises the steps of translating an instruction from a first representation to a translated representation, and setting a tag associated with the instruction in the first representation; and prior to execution of a given instruction in the first representation, examining the tag associated with the given instruction, and if such associated tag has been set, branching to the translated version of the given instruction, for further execution of the program, and if the tag has not been set, interpreting and compiling the given instruction from the first representation, for further execution of the program. Significantly, the examining of said tag is effected without <u>first attempting</u> a cache fetch<u>, so that the time</u>

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required to attempt a catch fetch is saved if said tag has not been set.

Support for the current amendment, discussed below, may be found, throughout the specification, and in particular in Fig. 2 and Fig. 3 (see for example, steps 200 and 300), and the corresponding description in the specification (see for example paragraph [0036] of Applicants' published specification), wherein the first step is to examine the tag.

In Applicant's prior papers, specific reference was made to paragraph [0061] of applicant's published application (approximately page 15 as filed), wherein it is noted that applicants' invention is an improvement over prior art systems because:

"prior art switching suffers either excessive memory consumption requirements if a switch monitor as described in May, op. cit., is used wherein a switch entry is associated with each instruction address, or from massive hardware requirements if all known entries are to be stored in a CAM memory structure, or from slow performance if all migrant instruction addresses must be read from cache/memory. The present invention improves on these prior techniques because the determination of whether a translation exists can be effected by the relatively fast technique of examining a field within the code tag associated with an instruction, rather than perform a cache fetch for possible translated versions in each case. Therefore, the current invention improves switch detection

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and translation without unduly degrading performance or posing massive hardware requirements." In other words, since the tag is examined before a cache fetch is attempted, the time is saved, and not wasted in what would be a futile operation.

It was noted in Applicant's prior papers that this is in sharp contrast to Bala, wherein the tag "hits" are the presence of translated code in a cache (see Bala, column 1, lines 43-48 and column 3, lines 22-30).

It is noted, and is further note in closing below, that the Examiner is now combining the teachings of Bala with Fu et al. However, it is submitted that this is an improper combination of references. First, Fu et al. simply deal with processing ordered data requests to a memory, and has nothing whatsoever to do with dynamic compiling or translating code from a first representation to a second representation. Second, Fu et al. deals with prefetches and the case when there is a miss in memory, and not with the examining of the tag being effected without performing a cache fetch. In other words, in Fu et al., when it is known that there will be a miss, then a prefetch is needed to find data. In Applicant's invention, if a tag is not set, it indicates that there is no translation of the code, and a prefetch is simply irrelevant and unnecessary, and time can be saved by not even attempting a fetch, as set forth in claim 1, as amended herein. It is respectfully submitted that the Examiner has not yet addressed such reasons for why it is not obvious to combine Bala and Fu et al. to reject the claims, as amended herein.

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For this reason alone, it is submitted that claim 1 is directed to patentable subject matter. However, claim 1 was previously amended, as noted above, to recite: _if the tag has not been set, interpreting and compiling the given instruction from the first representation, for further execution of the program_. Neither Bala nor Fu et al., whether taken alone or in combination, teach or suggest, based on the status of the tag, returning to the first representation, and interpreting and executing it. This provides the advantage of a fast and efficient way to continue executing the program, without undue burden in terms of additional operations and computational overhead, which could be required if additional translation were attempted. Thus, this is a second reason for why claim 1 is patentable over the combination of Bala and Fu et al.

In view of the above, it is respectfully submitted that claim 1 is directed to patentable subject matter.

Apparatus claim 11 has been amended in a manner analogous to method claim 1. For the reasons set forth with respect to claim 1, it is respectfully submitted that claim 11 is also directed to patentable subject matter.

Claim 21, which depends from claim 11, notes that the system further comprising an exception handler for execution of the program when an exception in the translated representation occurs. This enables the system to deal with certain difficulties, which may occur in the system environment. While the Examiner's comments with respect to Bala, col. 5, lines 55-67 have been noted, it is

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respectfully pointed out that what Bala teaches is simply code tracing, and does not deal with execution of the program. Thus, it is respectfully submitted that neither Bala nor Fu et al. teach or suggest an exception handler in the context of claim 11, from which claim 21 depends. It is thus submitted that claim 21 is directed to patentable subject matter.

The remaining claims depend from one of the independent claims discussed above. These claims have further recitations, which in combination with those of the claim from which they depend, are not taught or suggested by the art of record.

It is respectfully submitted that the Examiner is simply wrong with respect to claims 7 and 17, which were amended to recite that the tag is a single bit. Reference is made to Bala, column 3, and throughout. The undersigned could find no teaching or suggestion that the tag is a single bit. In fact the teachings of column 3 of Bala suggest that cache hit or miss signals would have more than a single bit. It is respectfully submitted that the Examiner admits as much in the rejection of claims 8 and 18. There is a patentable distinction between the hit signal, and the tag, as Bela clearly teaches that the tags comprise multiple bits. It is a major advantage, in terms of efficiency of storage for the tag to be a single bit, as in claims 7 and 17. Thus, it is submitted that the rejection of claims 7 and 17 is simply wrong, as it is not supported in fact or law.

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Claim 9 and claim 19 specify that a single tag corresponds to a plurality of instructions. This provides the advantage of reducing the number of tags that must be stored and examined in certain situations, such as when a series of instructions have the same tag status, thus further increasing the efficiency of execution of the program. It is respectfully submitted that there is no specific rationale for the rejection of these claim in the office action. Thus, it is submitted that claims 9 and 19 are also directed to patentable subject matter.

The detailed explanation in paragraph 4, on page 3 of the Office Action for combining the teachings of Bala and Fu is noted. However, this explanation requires many assumptions that are simply not taught or suggested by the references. It is submitted that the Examiner is simply skilled far beyond one of ordinary skill in the art, and has used that skill to frame a rejection. It is respectfully submitted that under the requirements of 35 U.S.C. 103, the Examiner should take a step away from viewing the subject matter using skill far beyond that of one of ordinary skill in the art, and then would find the subject matter of the claims to be patentable.

A check in the amount of $1,050 is enclosed for a three-month extension of time required for the filing of this paper.

Respectfully submitted,

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